

In the Specification:

On page 1 before the first paragraph, please insert the following paragraph:

This application claims priority to International Application No. PCT/DE99/03239 which was published in the German language on April 13, 2000.

Page 1 before the first paragraph, please delete the following:

~~Description~~

On page 1, between lines 4 and 5 please insert the following heading:

TECHNICAL FIELD OF THE INVENTION

Please replace the paragraph beginning on line 5 of page 1 with the following rewritten paragraph:

The invention relates to a communications system for radio travel operations, and in particular, to a communications system for radio travel operation for railway services.

On page 1, between lines 8 and 9 please insert the following heading:

BACKGROUND OF THE INVENTION

Please replace the paragraph beginning on line 9 of page 1 with the following rewritten paragraph:

Radio travel operations are an operating method with which the "route setting" and "route securing" functions are not implemented on the route, as in the past, but rather on the vehicle. A problem with this is the limited resources in terms of radio channels from the vehicle to the route and the associated long link setup times (typically 20-25 sec. including setup of the securing layer). Multiple radio communications have to be carried out simultaneously from the vehicle as a function of the vehicle speed and the density of vehicle elements, which the vehicle

has to set and secure. The radio standard provided for railway applications allows for just one radio channel for data communications per terminal. Even if two mobile radio terminals are used on the vehicle, bottlenecks may occur.

Please replace the paragraph beginning on line 25 of page 1 with the following rewritten paragraph:

DE 197 21 246 discloses a communications device for radio-supported railway services with which both the data from decentralized control devices and the data of central services can be transmitted to a train with just a single transmission channel. For this purpose, there are provisions for all this data to be fed to a central gateway computer. The latter then brings about the transmission data to the vehicle. By using a central gateway computer which is assigned to the train, it is possible to transmit all the data in multiplex mode without a new transmission route having to be set up between the vehicle and the central railway services when the train moves forward as a result of the change into a new route region.

Please replace the paragraph beginning on line 4 of page 2 with the following rewritten paragraph:

Furthermore, in order to avoid long communication paths, DE (GR 98 P 4131 DE) describes an optimized communication system for radio-supported traffic services. The system has one or more decentralized gateway computers in addition to the fixed, centralized services and the fixed decentralized control points in the traffic network. The communication between the mobile elements and the fixed elements is implemented via the gateway computers. In each case, a representative element is set up for the mobile elements which communicate with the gateway computers, in the gateway computer and in the fixed elements. For the fixed elements which communicate with the gateway computers, representative elements are set up directly in the gateway computer or indirectly via at least one information server. The representative information is updated in the gateway computer, and in the fixed elements, by means of an

update method between the representative elements in the gateway computer and the fixed elements or between the gateway computer and the information server.

Please replace the paragraph beginning on line 26 of page 2 with the following rewritten paragraph:

This method permits a plurality of logic connections to be multiplexed for a vehicle via a physical radio channel to a gateway, which is associated with a fixed network and which can forward the links to any desired end point within the fixed network.

On page 2, between lines 29 and 30, please insert the following headings and paragraphs:

SUMMARY OF THE INVENTION

In one embodiment of the invention, there is a communication system for radio travel operations for making radio transmissions of data transmitted in multiplex mode, using at least one gateway computer, wherein the radio links for the transmission of data between vehicles, route elements and a control center are set up via the gateway computer.

In one aspect of the invention, the communication system for radio travel operations, wherein the vehicles and the route elements are equipped with radio terminals, and the radio terminals also include line-bound communications terminals.

In another aspect of the invention, the communication system for radio travel operations, wherein the vehicles are trains and the route elements are railway switches, track locks, key locks, block or level crossings.

In still another aspect of the invention, the communication system for radio travel operations wherein communication between a plurality of trains and a route element is provided.

In yet another aspect of the invention, the method of communicating using multiplexed data radio transmission. The method transmitting the data in radio links between vehicles, route elements and a control center via at least one gateway computer.

BRIEF DESCRIPTION OF THE INVENTION

The invention will be explained in more detail below with reference to one exemplary embodiment which is illustrated at least partially in the figure.

Figure 1 shows a variant of a multiplex link from the vehicle into the control center and to the forwarding to route elements.

DETAILED DESCRIPTION OF THE INVENTION

Please replace the paragraph beginning on line 30 of page 2 with the following rewritten paragraph:

The invention provides a communication system for radio travel operations which uses simple means to traffic reliable data via effective communication paths with just one radio transmission channel between vehicles and route elements. This ensures simultaneous communication with a plurality of elements and minimizes expenditure on setting up, updating and maintaining the system.

On page 3, please delete lines 3-7.

Please replace the paragraph beginning on line 8 of page 3 with the following rewritten paragraph:

A particular advantage of the invention consists in the fact is that a single mobile terminal on one vehicle is sufficient to be able to communicate simultaneously with a plurality of route elements. This is possible because the radio links for the transmission of data from the vehicles to the route elements are not established directly, but rather are set up via a gateway computer. The price paid for this is that $(n+1)$ radio communications are necessary for communication with n route elements. Without multiplexing, n radio communications are necessary for this. A further

application of the gateway functionality in radio travel operations on double-track or multi-track routes generally includes setting up communication with level crossings via the gateway computer. This makes it possible for two or more trains to communicate simultaneously with the level crossing. Without a gateway computer this would have to take place successively, and could lead to operational impediments.

Please replace the paragraph beginning on line 29 of page 3 with the following rewritten paragraph:

A further advantage of the invention is the capability of supplying immediate stop instructions which, when necessary, are sent by radio to the vehicles from the radio travel operations control center can also be transmitted immediately via the multiplex channel in regions with a high route element density. This applies also to high-priority data which are sent by broadcast to all receive-end elements of the multiplex channel.

On page 4, please delete lines 1-6.

Please replace the paragraph beginning on line 7 of page 4 with the following rewritten paragraph:

Figure 1 illustrates an example of a route section composed of two railway switches W1, W2 and a level crossing LC. After the first link request has been implemented from the vehicle F to one of these three route elements (e.g. to the level crossing LC) via the gateway computer, each further link request from the vehicle F to another route element W1, W2 is multiplexed via the same physical link into the control center Z and forwarded from there to the desired route element W1 or W2 or LC.